

Remarks

Claims 1-20 are pending in the application. Claims 1-12 and 14-20 were rejected and claim 13 was objected to. Reconsideration of the claims is respectfully requested. No new matter has been added.

Rejection Under 35 U.S.C. § 102

Claims 1-4, 6, 10, 11 and 14-19 were rejected under § 102(b) as being anticipated by U.S. Patent No. 4,967,567 issued to Proctor (hereinafter “Proctor ‘567”). Independent claims 1, 10 and 18 and their respective dependent claims are discussed separately below.

A *prima facie* case has not been established for the rejection of claim 1. Claim 1 recites a system for assessing a refrigerant charge level in a vehicle air conditioning system. The system comprises “a first sensor for providing a cooled air temperature signal; a second sensor for providing an ambient air temperature signal; a third sensor for providing an ambient air humidity signal; a fourth sensor for providing a compressor cycling signal; a processing module for determining a refrigerant charge level as a function of signals from the first, second, third, and fourth sensors; and an indicator for indicating that the level of refrigerant charge is acceptable if the refrigerant charge level is greater than a threshold value.”

Proctor ‘567 does not disclose the limitations of claim 1. For example, Proctor ‘567 does not disclose a processing module for determining a refrigerant charge level as a function of signals from the first, second, third, and fourth sensors. Indeed, there is no disclosure in Proctor ‘567 of determining a refrigerant charge level as claimed. Contrary to the Examiner’s arguments, Figures 2-4 do not disclose this claim limitation. Figure 2 relates to a system for “automatically detecting whether the air conditioning system is cycling or non-cycling” (see column 14, lines 33-34). Figure 3 relates to a system for “determining valid data for non-cycling systems” (see column 15, lines 55-56). Figure 4 relates to a system for “determining valid data for non-cycling systems” (see column 16, lines 18-19). These three

systems “share a plurality of registers R[1]-R[5] for storing sets of actual system values of discharge pressure, suction pressure, and discharge air temperature” (see column 3, lines 11-14). In other words, the systems in Figures 2-4 do not determine a refrigerant charge level and are not based on ambient air temperature, ambient air humidity, or compressor cycling as recited in claim 1. Moreover, factors such as ambient relative humidity are only used to modify “acceptable ranges of temperature and pressure” (see column 18, lines 41-43) and do not relate to refrigerant charge level. Applicant also notes that the Examiner presented no arguments and did not address the claim limitation of “an indicator for indicating that the level of refrigerant charge is acceptable if the refrigerant charge level is greater than a threshold value” which by itself is sufficient to negate establishment of a *prima facie* case. For these reasons, a *prima facie* case has not been established for the rejection of claim 1 and Applicant respectfully requests that this rejection be withdrawn. Since claims 2-4 and 6 depend on claim 1, a *prima facie* case has not been established for the rejection of these claims for the same reasons.

Even if a proper rejection was established for the rejection of claim 1, a *prima facie* case has not been established for the rejection of claim 2. Claim 2 recites “a second indicator for indicating that the level of refrigerant is unacceptable if the refrigerant charge level is less than the threshold value.” Proctor ‘567 does not disclose the limitations of claim 2. Moreover, the Examiner has provided no arguments directed to the limitations of claim 2. Thus, Applicant respectfully requests that this rejection be withdrawn.

Even if a proper rejection was established for the rejection of claim 1, a *prima facie* case has not been established for the rejection of claim 4. Claim 4 recites that “the fourth sensor is a voltage sensor.” Proctor ‘567 does not disclose the limitations of claim 4. Moreover, the passage cited by the Examiner (column 3, line 1) has absolutely nothing to do with any sensor. Thus, Applicant respectfully requests that this rejection be withdrawn.

Even if a proper rejection was established for the rejection of claim 1, a *prima facie* case has not been established for the rejection of claim 6. Claim 6 recites that “the fourth

signal is provided to the processing unit by a powertrain control module mounted on the vehicle that controls engagement of a compressor clutch.” Proctor ‘567 does not disclose the limitations of claim 6. Moreover, the passage cited by the Examiner (Abstract lines 8-9) recites “determining whether the air conditioning system has a cycling or non-cycling [sic] clutch” and does not disclose a fourth signal, a powertrain control module, or any limitations of claim 6. Thus, Applicant respectfully requests that this rejection be withdrawn.

A prima facie case has not been established for the rejection of claim 10. Claim 10 recites “a method of assessing a level of refrigerant charge in a vehicle air conditioning system with a refrigerant assessment system, the vehicle air conditioning system including a refrigerant subsystem having a compressor adapted to circulate a refrigerant and an air handling subsystem for providing air cooled by the refrigerant subsystem to a vehicle passenger compartment, and the refrigerant assessment system including a control module adapted to receive a first signal indicative of a cooled air temperature, a second signal indicative of an ambient air temperature, a third signal indicative of an ambient air humidity, and a fourth signal indicative of cycling of the compressor between engaged and disengaged states, the method comprising the steps of: calculating as a function of the first, second, third, and fourth signals a refrigerant charge value indicative of an amount of refrigerant in the vehicle air conditioning system; determining whether the refrigerant charge value exceeds a threshold value indicative of a desired refrigerant charge amount; and signaling that the level of refrigerant is acceptable if the refrigerant charge value is greater than the threshold value.”

Proctor ‘567 does not disclose the limitations of claim 10. For example, Proctor ‘567 does not disclose calculating as a function of the first, second, third, and fourth signals a refrigerant charge value indicative of an amount of refrigerant in the vehicle air conditioning system. Indeed, there is no disclosure in Proctor ‘567 of calculating a refrigerant charge value as claimed. Contrary to the Examiner’s arguments, Figures 2-4 do not disclose this claim limitation. Figure 2 relates to a system for “automatically detecting whether the air conditioning system is cycling or non-cycling” (see column 14, lines 33-34). Figure 3 relates to a system for “determining valid data for non-cycling systems” (see column 15, lines 55-56).

Figure 4 relates to a system for “determining valid data for non-cycling systems” (see column 16, lines 18-19). These three systems “share a plurality of registers R[1]-R[5] for storing sets of actual system values of discharge pressure, suction pressure, and discharge air temperature” (see column 3, lines 11-14). In other words, the systems in Figures 2-4 do not determine a refrigerant charge level and are not based on ambient air temperature, ambient air humidity, or compressor cycling as recited in claim 10. Moreover, factors such as ambient relative humidity are only used to modify “acceptable ranges of temperature and pressure” (see column 18, lines 41-43) and do not relate to refrigerant charge level. It logically follows that since Proctor ‘567 does not disclose calculating a refrigerant charge value as claimed it cannot possibly disclose the steps of “determining whether the refrigerant charge value exceeds a threshold value indicative of a desired refrigerant charge amount” or “signaling that the level of refrigerant is acceptable if the refrigerant charge value is greater than the threshold value.” For these reasons, a *prima facie* case has not been established for the rejection of claim 10 and Applicant respectfully requests that this rejection be withdrawn. Since claims 11 and 14-17 depend on claim 10, a *prima facie* case has not been established for the rejection of these claims for the same reasons.

Even if a proper rejection was established for the rejection of claim 10, a *prima facie* case has not been established for the rejection of claim 11. Claim 11 recites “the step of signaling that the level of refrigerant is not acceptable if the refrigerant charge level is less than the threshold value.” Proctor ‘567 does not disclose the limitations of claim 11. Moreover, the Examiner has provided no arguments directed to the limitations of claim 11. Thus, Applicant respectfully requests that this rejection be withdrawn.

Even if a proper rejection was established for the rejection of claim 10, a *prima facie* case has not been established for the rejection of claim 14. Claim 14 recites that “the first signal indicative of a cooled air temperature is provided by a temperature sensor disposed near a vent aperture in the air handling subsystem.” Proctor ‘567 does not disclose the limitations of claim 14. For example, there is no disclosure of a vent aperture or an air handling subsystem in Proctor ‘567. Thus, Applicant respectfully requests that this rejection

be withdrawn.

Even if a proper rejection was established for the rejection of claim 10, a *prima facie* case has not been established for the rejection of claim 17. Claim 17 recites that “the fourth signal indicative of cycling of the compressor is provided by a powertrain control module disposed on the vehicle.” Proctor ‘567 does not disclose the limitations of claim 17. Moreover, the passage cited by the Examiner (Abstract lines 8-9) recites “determining whether the air conditioning system has a cycling or non-cyling [sic] clutch” and does not disclose a fourth signal, a powertrain control module, or any limitations of claim 17. Thus, Applicant respectfully requests that this rejection be withdrawn.

A *prima facie* case has not been established for the rejection of claim 18. Claim 18 recites a “method for assessing a refrigerant charge level in an air conditioning system disposed in a vehicle, the vehicle having an engine, a compressor having a clutch and adapted to be driven by the engine and circulate a refrigerant to provide a cooling effect when the clutch is engaged, a duct for providing air cooled by the refrigerant to a vehicle passenger compartment, a first signal indicative of a cooled air temperature, a second signal indicative of an ambient air temperature, a third signal indicative of an ambient air humidity, and a fourth signal indicative of engagement of the clutch, the method comprising the steps of: calculating as a function of the first, second, third, and fourth signals a refrigerant charge value indicative of an amount of refrigerant in the air conditioning system; determining whether the refrigerant charge value exceeds a threshold value indicative of a desired amount of refrigerant in the air conditioning system; and signaling that the level of refrigerant is acceptable if the threshold value is exceeded.”

Proctor ‘567 does not disclose the limitations of claim 18. For example, Proctor ‘567 does not disclose calculating as a function of the first, second, third, and fourth signals a refrigerant charge value indicative of an amount of refrigerant in the air conditioning system. Indeed, there is no disclosure in Proctor ‘567 of calculating a refrigerant charge value as claimed. Contrary to the Examiner’s arguments, Figures 2-4 do not disclose this claim

limitation. Figure 2 relates to a system for “automatically detecting whether the air conditioning system is cycling or non-cycling” (see column 14, lines 33-34). Figure 3 relates to a system for “determining valid data for non-cycling systems” (see column 15, lines 55-56). Figure 4 relates to a system for “determining valid data for non-cycling systems” (see column 16, lines 18-19). These three systems “share a plurality of registers R[1]-R[5] for storing sets of actual system values of discharge pressure, suction pressure, and discharge air temperature” (see column 3, lines 11-14). In other words, the systems in Figures 2-4 do not determine a refrigerant charge level and are not based on ambient air temperature, ambient air humidity, or compressor cycling as recited in claim 18. Moreover, factors such as ambient relative humidity are only used to modify “acceptable ranges of temperature and pressure” (see column 18, lines 41-43) and do not relate to refrigerant charge level. It logically follows that since Proctor ‘567 does not disclose calculating a refrigerant charge value as claimed it cannot possibly disclose the steps of “determining whether the refrigerant charge value exceeds a threshold value indicative of a desired amount of refrigerant in the air conditioning system” or “signaling that the level of refrigerant is acceptable if the threshold value is exceeded.” For these reasons, a *prima facie* case has not been established for the rejection of claim 18 and Applicant respectfully requests that this rejection be withdrawn. Since claim 19 depends on claim 18, a *prima facie* case has not been established for the rejection of these claims for the same reasons.

Even if a proper rejection was established for the rejection of claim 18, a *prima facie* case has not been established for the rejection of claim 19. Claim 19 recites “the step of signaling that the level of refrigerant is not acceptable if the threshold value is not exceeded.” Proctor ‘567 does not disclose the limitations of claim 19. Moreover, the Examiner has provided no arguments directed to the limitations of claim 19. Thus, Applicant respectfully requests that this rejection be withdrawn.

Rejection Under 35 U.S.C. § 103

Claims 5, 7-9, 12 and 20 were rejected under § 103(a) as being unpatentable over Proctor '567. Claims 5 and 7-9 depend on claim 1. Claim 12 depends on claim 10. Claim 20 depends on claim 18. Consequently, these claims are believed to be allowable for the reasons previously discussed.

Applicant again states that a *prima facie* case has not been established for the rejection of claim 12. Claim 12 recites that “the first and fourth signals are sampled more frequently than the second and third signals.” Contrary to the Examiner’s contentions it is not well known that ambient temperature and humidity change less frequently than compressor cycling and cooled air temperature. Indeed, the opposite is true in a myriad of vehicle operating conditions, such as during elevation changes, exit or entry of a vehicle from and enclosed area, etc. Applicant challenges the Examiner’s arguments as (1) not constituting proper Official Notice and (2) not properly based on common knowledge. Documentary evidence must now be provided in the next Office Action if this rejection is to be maintained in accordance with § MPEP 2144.03.

Applicant again states that a *prima facie* case has not been established for the rejection of claim 20. Claim 20 recites that the second and third signals are sampled less frequently than the first and fourth signals. Contrary to the Examiner’s contentions it is not well known that ambient temperature and humidity change less frequently than compressor cycling and cooled air temperature. Indeed, the opposite is true in a myriad of vehicle operating conditions, such as during elevation changes, exit or entry of a vehicle from and enclosed area, etc. Applicant also challenges the Examiner’s arguments as (1) not constituting proper Official Notice and (2) not properly based on common knowledge. Documentary evidence must now be provided in the next Office Action if this rejection is to be maintained in accordance with § MPEP 2144.03. Thus, Applicant requests that the rejection of claim 20 be withdrawn.

Conclusion

Applicant has made a genuine effort to respond to the Examiner's objections and rejections in advancing the prosecution of this case. Applicant believes all formal and substantive requirements for patentability have been met and that this case is in condition for allowance, which action is respectfully requested. Please charge any fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978.

Respectfully submitted,

HSIAO-AN HSIEH

By /Matthew M. Mietzel/
Matthew M. Mietzel
Reg. No. 46,929
Attorney for Applicant

Date: September 24, 2007

BROOKS KUSHMAN P.C.
1000 Town Center, 22nd Floor
Southfield, MI 48075-1238
Phone: 248-358-4400
Fax: 248-358-3351